



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,251	02/19/2004	Richard E. Pingree Jr.	ATI-0022	2250
23413 7590 02/02/2009 CANTOR COLBURN, LLP 20 Church Street 22nd Floor Hartford, CT 06103				
EXAMINER				
AKRAM, IMRAN				
ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
02/02/2009		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptopatentmail@cantorcolburn.com

Office Action Summary

Application No.

10/708,251

Applicant(s)

PINGREE ET AL.

Examiner

IMRAN AKRAM

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 17-33 is/are pending in the application.
- 4a) Of the above claim(s) 1-13 and 27-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14, 15, 17-26, 32 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 14, 15, 17-26, 32, and 33 have been considered but are moot in view of the new ground(s) of rejection necessitated by amendment.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 14, 15, 17-26, 32, and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 14 recites the limitation "volatize the solid material contained therein" in line 13 of the claim. Since the term "a solid material" is previously claimed in claim 14 on line 8 it is assumed that this is the antecedent basis. However, the claim continues after "a solid material" on line 8 with the words "and/or a gaseous byproduct removed from the work-piece." Thus, if a gaseous byproduct is the medium of interest than no solid material need exist and the language "volatize the solid material contained therein" has no antecedent basis. There is insufficient antecedent basis for this limitation in the claim. Claims 15, 17, and 18 depend upon claim 14.

5. Claim 19 recites the limitation "volatize the solid material" in line 11 of the claim. Since the term "a solid material" is previously claimed in claim 19 on line 10 it is

assumed that this is the antecedent basis. However, the claim continues after "a solid material" on line 10 with the words "and/or a gaseous byproduct removed from a semiconductor work-piece." Thus, if a gaseous byproduct is the medium of interest than no solid material need exist and the language "volatize the solid material contained therein" has no antecedent basis. There is insufficient antecedent basis for this limitation in the claim. Claims 20-26, 32, and 33 depend upon claim 19.

6. Claim 26 recites the limitation "said photoresist material" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 14, 15, 17-20, 22-26, 32, and 33 are rejected under 35 U.S.C. 102(e) as being anticipated by Raoux (US 7,004,107 B1).

9. Regarding claim 14, Raoux discloses a plasma processing chamber **30** configured to uniformly convey plasma onto a surface of a work-piece **36** contained therein (column 4, lines 47-62); a flow path **89** in fluid communication with the processing chamber, the flow path configured to contain a medium of interest

transported to and from the plasma processing chamber, wherein the medium of interest contains a solid material and/or gaseous byproduct removed from the work-piece (column 6, lines 26-32); a volatilizing electromagnetic energy source **5** downstream from the plasma processing chamber coupled to the flow path for exciting said medium of interest so as to volatize the solid material contained therein (column 9, lines 1-30); and an impedance measuring device **110** for measuring an impedance value of an electromagnetic circuit, said electromagnetic circuit including said flow path therein, wherein said impedance value corresponds to an amount of solid material within said medium of interest (column 18, lines 40-62).

10. Regarding claim 15, Raoux discloses that said electro-magnetic circuit further comprises a radio frequency (RF) circuit (column 4, lines 58-62).

11. Regarding claims 17 and 18, Raoux discloses a mechanism for determining variations of said impedance magnitude and phase values over time (column 17, lines 31-38).

12. Regarding claim 32, Raoux discloses that the electromagnetic energy source is configured to provide a high power and a low power duty cycle, wherein the high power duty cycle is effective to vaporize volatize the solid material, and wherein the impedance measuring device is configured to be operative during the low power duty cycle (column 18, lines 40-62).

13. Regarding claim 19, Raoux discloses a plasma processing chamber **30** configured to uniformly convey plasma onto a surface of a work-piece **36** contained therein (column 4, lines 47-62); a volatilizing electromagnetic energy source **5** coupled

to an effluent carrying conduit downstream from a plasma processing chamber, wherein the volatilizing electromagnetic energy source is configured to cause excitation of a gas having reactive species therein, wherein the excited gas may include a solid material and/or gaseous byproduct removed from a semiconductor work-piece, and wherein the excitation is effective to volatilize the solid material (column 6, lines 26-32); a mechanism **40** for uniformly conveying the excited gas; and an impedance measuring device **110** for measuring an impedance value of an electromagnetic circuit, said electromagnetic circuit including said excited gas therein, wherein said impedance value corresponds to an amount of solid material within said gas (column 18, lines 40-62).

14. Regarding claim 20, Raoux discloses that said electro-magnetic circuit further comprises a radio frequency (RF) circuit (column 4, lines 58-62).

15. Regarding claims 22 and 23, Raoux discloses a mechanism for determining variations of said impedance magnitude and phase values over time (column 17, lines 31-38).

16. Regarding claims 24 and 25, Raoux discloses that said downstream electromagnetic energy source is configured to apply power at a power level of about 300 W (column 19, lines 36-39).

17. Regarding claim 26, Raoux discloses that said impedance measuring device is configured for facilitating endpoint detection of removal of said photoresist material (column 4, lines 62-65).

18. Regarding claim 33, Raoux discloses that the electromagnetic energy source is configured to provide a high power and a low power duty cycle, wherein the high power

duty cycle is effective to vaporize volatilize the solid material, and wherein the impedance measuring device is configured to be operative during the low power duty cycle (column 18, lines 40-62).

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

21. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

22. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Raoux as applied to claim 19 above.

23. Raoux does not disclose the downstream electromagnetic source to be microwaves. However, Raoux discloses a secondary, upstream source of microwaves 4 to provide additional microwave plasma (column 10, lines 39-45). It would have been obvious to one having ordinary skill in the art at the time of invention to use the downstream electromagnetic energy source to excite said medium of interest of Raoux into a microwave plasma instead of using a secondary source to do so to streamline the operation if microwave plasma was desired.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IMRAN AKRAM whose telephone number is (571)270-3241. The examiner can normally be reached on 10-7 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

IA

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795